

(RESEARCH ARTICLE)



## Bridging the care gap: Harnessing telehealth for enhanced care access among adults with chronic health conditions in South-Eastern Nigeria

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### Abstract

**Introduction:** Telehealth is a term that refers to the use of information communication technology to access both clinical and non-clinical health services. It bridges the long-distance barrier between the patient and the clinician. It allows for patient care, advice, reminders, education, intervention, monitoring, and remote admission. The objective of this study is to determine the use of telehealth for health care by adults with chronic health conditions among households in an urban community in South-Eastern Nigeria.

**Methods:** This is a cross-sectional survey. Data was collated using an interviewer-administered questionnaire. Results were analyzed using SPSS version 25.

**Results:** Their mean age was 39.9years with a range of 19 – 95years. Overall, 83.9% of the participants were aware of telehealth while 37.3% had a good knowledge of telehealth. 64% of the respondents had used telehealth before, and 38.7% of users used telehealth in emergencies only. 95.9% of the respondents owned either a phone or a laptop and speaking with a doctor or nurse on the phone about current health status was the commonest form of telehealth used by respondents [128(58.98%)]. Furthermore, the commonest facilitator to participants' use of telehealth was level of computer literacy, while the commonest barrier noted was poor mobile network. There was statistically significant relationship between at least fair level of knowledge of telehealth and use of telehealth ( $P<0.001$ ).

**Discussion:** To improve the awareness, level of knowledge and use of telehealth for healthcare, concerted efforts between individuals, health care professionals, telecommunication agencies, NGOs and the government is required.

**Keywords:** Telehealth; Information communication technology; Chronic health conditions; Healthcare

### 1. Introduction

Telehealth is a term that refers to the use of information communication technology to access both clinical and non-clinical health services<sup>1</sup>. It involves the use of audio, videos, or other telecommunication technologies to monitor patients' status at a distance<sup>2</sup>. It bridges the long-distance barrier between patient and clinician. It allows for patient care, advice, reminders, education, intervention, monitoring, and remote admission<sup>2</sup>. It is not intended to isolate healthcare workers from patients, topple doctors or healthcare providers.

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The origins of Telehealth can be traced back to the mid - late 19th century with one of the first published accounts occurring in the early 20th century when electrocardiograph data were transmitted over telephone wires<sup>3</sup>. Telehealth in its modern form, started in the 1960s in large part driven by the military and space technology sectors, as well as a few individuals using readily available commercial equipment<sup>3</sup>. Examples of early technological milestones in telehealth include the use of television to facilitate consultations between specialists at a psychiatric institute and general practitioners at a state mental hospital and the provision of expert medical advice from a major teaching hospital to an airport medical centre<sup>3</sup>. Health care in the home-based setting has a long history. For example, an 1879 article in the *Lancet* talked about using the telephone to reduce unnecessary office visits<sup>4</sup>. In 1925, a cover of *Science and Invention* magazine showed a doctor diagnosing a patient by radio, and within envisioned a device that would allow for the video examination of a patient over distance<sup>4</sup>.

Health care according to Merriam-Webster dictionary is the efforts made to maintain or restore physical, mental or emotional well-being especially by trained and licensed professionals<sup>5</sup>. Chronic health conditions according to Wikipedia are human health conditions or disease that is persistent or long-lasting in its effects or a disease that comes with time. Examples include cancer, Diabetes mellitus, Hypertension, asthma amongst others<sup>6</sup>. The term 'chronic' however for the purpose of this study will be for the diseases whose course lasts for more than six months. Several complications and death occur in adults who have Diabetes, hypertension and cancer. These group of people are also faced with challenges like financial constraint, distance from health facility, not wanting to go alone to the hospital and for some, getting permission to go to a hospital when there's a need to access a health facility for health care<sup>7</sup>. When they eventually get to the hospital/clinics, those in urban centers are sometimes faced with long waiting time in the clinic and paucity of skilled manpower (cardiologist, endocrinologist and oncologist). These obstacles can be prevented or curtailed simply using telehealth.

Traditionally, chronic health conditions have been managed through a frequent office-based model rather than a care management model, which uses frequent patient contact and regular physiologic measurement<sup>3</sup>. Due to the increasing number of adults with chronic health conditions in households in urban communities in Nigeria and the importance of their usage of telehealth, this study hopes to provide adequate information on the awareness and level of knowledge of telehealth by adults with chronic diseases, their usage of telehealth and the factors affecting their usage of telehealth. These will guide in providing ways to increase the usage of telehealth for health care by these adults who have chronic diseases.

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## **2. Material and methods**

### **2.1. Study Area**

This study was conducted in Nnewi, a town located in the southern part of Anambra state, South-Eastern Nigeria.<sup>8</sup> Nnewi is hub to one of the biggest markets in South-Eastern Nigeria popularly known for motorcycle spare parts and home to the only federal Teaching Hospital in the state, Nnamdi Azikiwe University Teaching Hospital and also home to College of Health Sciences, Nnamdi Azikiwe University, Nnewi campus. It is a commercial and industrial city home to mostly traders and quite a few civil servants, students and farmers with an estimated population density of 900,000 people.<sup>8</sup> Almost every area of the town has good network coverage, hence getting access to and utilizing telehealth is made simple and possible.

### **2.2. Study Design**

A cross-sectional descriptive study was adopted for this work.

### **2.3. Study Population**

The study population comprised of adults equal or greater than 19 years of age who have chronic health conditions and live in Nnewi town, Anambra state, Nigeria.

### **2.4. Inclusion Criteria**

Respondents must be equal to or above 19 years of age and have at least one chronic health condition.

### **2.5. Exclusion Criteria**

- People who have lived in Nnewi town for less than 1 year (these will include visitors and traders amongst others from rural communities).

- Respondents who met the inclusion criteria but did not give consent.
- Respondents who met the inclusion criteria but are too sick to participate in the study.

## 2.6. Sample Size Determination

The formula below was used to calculate the sample size.

$$N = \frac{Z^2pq}{d^2}$$

where

N is the minimum sample size

z is the standard normal deviate (1.96) at 95% confidence level.

p = 83% from a previous study on percentage of people who use telehealth.<sup>9</sup>

q = 1-p = 1- 0.83= 0.17

d is the degree of precision set at 5% (0.05)

$$N = \frac{(1.96)^2 \times 0.83 \times 0.17}{(0.05)^2}$$

$$N = 216.8199$$

$$N = 217$$

## 2.7. Sampling Technique

A Multistage sampling technique was used for this study. Anambra state has 7 urban communities, of which a simple random sampling technique was used to select Nnewi from the 7 urban communities. Stratified sampling technique was used to divide Nnewi into four zones (Otolo, Uruagu, Nnewichi, Umudim). An equal proportion of the sample size (N= 217) was allocated to the four zones making up the Nnewi metropolis.

## 2.8. Study Instrument

This study employed a semi-structured interviewer-administered questionnaire for data collection.

## 2.9. Training of Research Assistance

Two research assistants were recruited from amongst the clinical medical students, trained and briefed on the aim of the study. They helped in the interviewing of the respondents and subsequent filling of the questionnaires.

## 2.10. Data Management and Analysis.

The data collected were cleaned and analyzed using the statistical package for social sciences (SPSS), version 26. Numerical variables were reported as mean and standard deviation, while categorical data were reported using proportion and percentages. Chi-square test was used to assess the association between categorical variables. Variables with p-value ≤ 0.05 in the confidence interval of 95% was taken as being significant.

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## 3. Results

The socio-demographic distribution of the respondents who participated in this study (**Table 1**) shows that the mean age of the participants was 39.92 years with a standard deviation of 17.762 years with most participants being between 24 to 28 years (24%). Most respondents 115 (53%) were females. Also, most of the respondents 95(43.8%) were currently married. Greater number of the respondents 96(44.2%) had secondary school as the highest level of education, 214(98.6%) were Christians, 213(98.2%) were of the Igbo tribe. The study also showed that 134(61.8%) of the respondents were employed; the majority 60(27.6%) of whom were into small-scale trading. A great percentage of the respondents 88(40.6%) were high income earners.

**Table 1** Socio-demographic Information of Studied Population

Variable		Frequency	Percent
Age group	19-23	33	15.2
	24-28	52	24
	29-33	20	9.2
	34-38	16	7.4
	39-43	14	6.5
	44-48	16	7.4
	49-53	16	7.4
	54-58	17	7.8
	59-63	11	5.1
	64-68	8	3.7
	69-73	2	0.9
	74-78	3	1.4
	79-83	3	1.4
	84-88	1	0.5
	89-93	4	1.8
	94-98	1	0.5
	<i>Mean ± SD</i>	<i>39.92±17.76</i>	
Gender	Male	102	47
	Female	115	53
Marital Status	Never married	94	43.3
	Currently married	95	43.8
	Separated	2	0.9
	Divorced	2	0.9
	Widowed	24	11.1
Level of education	Primary school	31	14.3
	Secondary school	96	44.2
	Tertiary	77	35.5
	Postgraduate degree	2	0.9
	No formal education	11	5.1
Religion	Christianity	214	98.6
	Islam	2	0.9
	Traditional	1	0.5
Tribe	Igbo	213	98.2
	Hausa	2	0.9
	Yoruba	1	0.5

	Eckanker	1	0.5
Employment status	Employed	134	61.8
	Schooling	50	23
	Unemployed	28	12.9
	No response	5	2.3
Employment type	Civil service	27	12.4
	Artisan	36	16.6
	Small-scale trading	60	27.6
	Large-scale trading	18	8.3
	No response	76	35
Average monthly income	Low income	46	21.2
	Middle income	81	37.3
	High income	88	40.6
	No response	2	0.9

**Table 2** Awareness of use of telehealth for health care

Variable	Frequency	Percentage
Yes	182	83.9
No	35	16.1

While 182(83.9%) of the respondents were aware of telehealth, 35(16.1%) of the respondents were not aware of telehealth even after the concept was explained.

**Table 3** level of knowledge of respondents regarding telehealth

Variable	Frequency	percentage
<b>level of knowledge regarding telehealth</b>		
Good	81	37.3
Fair	68	31.3
Poor	68	31.3

The majority 149(68.6%) of the respondents had at least fair knowledge of telehealth.

Two hundred and eight (208) (95.9%) respondents owned either a phone or a laptop. Most of the respondents 140(64%) had used telehealth before. 48(22.1%) which represents the highest among the users, used telehealth less than a week prior to the study. 84(38.7%) which represents the highest figure among users, only used telehealth in emergencies. Speaking with a doctor or nurse on the phone about current health status was the commonest form of telehealth used by respondents [ 128(58.98%)].

**Table 4** Use of telehealth for health care

Variable Data		Frequency	Percentage
Do you own a phone or laptop?	Yes	208	95.9
	No	9	4.1
Have you used telehealth before?	Yes	140	64.5
	No	77	35.5
When was the last time you used telehealth?	Less than 1 week ago	48	22.1
	1 - 4 weeks ago	32	14.7
	4 weeks - 3 months ago	24	11.1
	3 - 6 months ago	12	5.5
	Greater than 6 months ago	30	13.8
	No response	71	32.7
How often do you use telehealth?	Once a year	7	3.2
	2 - 4 times a year	11	5.1
	5 - 6 times a year	6	2.8
	More than 6 times a year	37	17.1
	Only in emergencies	84	38.7
	No response	72	33.2
What do you use telehealth for?	Speaking with a doctor or nurse on the phone about my current health status	128	58.98
	Sending laboratory result or radiological investigation to the doctor	42	19.35
	Getting reminder on when to take my drugs on my phone	35	16.13
	Getting education about my health from the internet	72	33.18
	Speaking with a doctor on the phone about your recent health development	109	50.23

The factors were divided into barriers and facilitators, which are factors affecting in a good way how respondents use telehealth. One hundred and twenty-one (55.76%) respondents had level of literacy as the commonest factor that affects in a good way how they use telehealth. Other facilitators that affected in a good way how respondents used telehealth include level of education, health literacy, increased convenience, ease of reaching out to a doctor, good cost of using telehealth, adequate electricity, age, having a high income, health insurance, being under health insurance and perceived good health status.

The commonest 99 (45.52%) barrier to the use of telehealth is poor network; other barriers include high cost of using telehealth, age, perceived good health status, not being under health insurance, low income, poor electricity, lack of convenience, ease of reaching out to a doctor, no long-term result, self-management difficult to maintain, attitude of doctors, difficulty in reaching a doctor.

**Table 5** Factors affecting use of telehealth for health care.

Variable		Frequency	Percentage
Which of these affects in a good way how you use your phone to get help from your doctor or the internet regarding your health.	Age	34	15.67
	Level of education	112	51.61
	Level of computer literacy	121	55.76
	Health literacy	98	45.16
	Good cost of using telehealth	66	30.41
	Perceived good health status	10	4.6
	Being under health insurance	15	6.91
	Having a high income	16	7.37
	Adequate electricity	61	28.11
	Increased convenience	84	38.71
	Ease of reaching out to a doctor	79	36.4
Which of these is a barrier to your use of telehealth.	High cost of using telehealth	37	17.05
	Age	56	25.80
	Perceived good health status	22	10.14
	Not being under health insurance	46	21.20
	Low income	50	23.04
	Poor electricity	89	41.01
	Lack of convenience	24	11.06
	Ease of reaching out to a doctor	26	11.98
	No long-term result	6	2.76
	Self-management difficult to maintain	40	18.43
	Poor network	99	45.62
	Attitude of doctors	0	0
	Difficulty in reaching a doctor or nurse	68	31.33
	Others	10	4.6

This regression model indicated that participants with higher education (at least having the senior school certificate examination) are more likely to possess high level of knowledge of telehealth with Adjusted Odds Ratio (AOR): 0.096, 95% CI (0.013, 0.687). The model however showed no significant association between level of knowledge of telehealth and gender, marital status, average monthly income of head of household and employment status.

**Table 6** Relationship between level of knowledge of telehealth and socio-demographic variables

<b>Independent variable</b>	<b>low</b>	<b>high</b>	<b>AOR(CI)</b>	<b>p-value</b>
Gender				0.852
Male	34	68	1.070(0.526, 2.175)	0.852
Female	34	81	.	.
Marital status				0.190
Never married	29	65	2.367(0.476, 11.779)	0.293
Currently married	29	66	1.676(0.387, 7.253)	0.490
Separated	0	2	.	.
Divorced	0	2	.	.
Widowed	10	14	.	.
Highest level of education				0.027
Primary	17	14	0.440(0.065, 2.977)	0.400
Secondary	23	73	0.096(0.013, 0.687)	0.020
Tertiary	20	57	0.110(0.015, 0.818)	0.031
Postgraduate	1	1	0.459(0.014, 14.894)	0.661
No formal education	7	4	.	.
Employment status				0.346
Employed	37	97	0.489(0.169, 1.416)	0.187
Schooling	17	33	0.738(0.205, 2.653)	0.642
Unemployed	12	16	.	.
Average monthly income				0.230
Low	19	27	2.114(0.870, 5.140)	0.099
Middle	25	56	1.545(0.694, 3.439)	0.287
High	23	65	.	.
How often use telehealth				0.113
Once a year	1	6	0.535(0.052, 5.463)	0.598
2 – 4 times a year	2	9	0.885(0.160, 4.886)	0.889
5 – 6 times a year	2	4	2.281(0.327, 15.909)	0.405
More than 6 times a year	10	27	1.439(0.542, 3.819)	0.465
Not specify	34	38	2.807(1.266, 6.221)	0.011
Only in emergencies	19	65	.	.



**Table 7** Relationship between age and level of knowledge

		Level of knowledge			X <sup>2</sup>	p-value
		Good	Fair	Poor		
Age group	19-23	17	8	8	37.865	0.153
	24-28	16	17	19		
	29-33	9	6	5		
	34-38	12	2	2		
	39-43	6	5	3		
	44-48	6	7	3		
	49-53	4	7	5		
	54-58	4	6	7		
	59-63	3	5	3		
	64-68	3	2	3		
	69-73	0	0	2		
	74-78	0	2	1		
	79-83	0	1	2		
	84-88	0	0	1		
	89-93	1	0	3		
94-98	0	0	1			

Level of knowledge of telehealth was seen to decrease with age. The age group (19-23) showing the highest number of people with a good level of knowledge of telehealth.

**Table 8** Relationship between the socio-demographic variables and the use of telehealth

		Have you used telehealth before?		X <sup>2</sup>	p-value
		Yes	No		
Gender	Male	62	40	1.171	0.279
	Female	78	37		
Marital status	Never married	55	39	5.236	0.264
	Currently married	68	27		
	Separated	2	0		
	Divorced	1	1		
	Widowed	14	10		
Highest Level of Education attained	Primary school	14	17	8.011	0.091
	Secondary school	69	27		
	Tertiary	50	27		
	Postgraduate degree	1	1		
	No formal education	6	5		

Religion	Christianity	138	76		
	Islam	1	1	0.734	0.693
	Traditional	1	0		
Tribe	Igbo	137	76		
	Hausa	1	1	1.288	0.732
	Yoruba	1	0		
	Eckanker	1	0		
Occupation	Employed	91	43		
	Schooling	25	25	9.100	0.011
	Unemployed	23	5		
If employed	Civil service	21	6		
	Artisan	25	11	2.825	0.419
	Small-scale trading	36	24		
	Large-scale trading	12	6		
Average Monthly income for the head of the household.	Low income	28	18		
	Middle income	53	28	0.288	0.866
	High income	57	31		

There was a significant relationship between occupation and the use of telehealth ( $p = 0.011$ ). There was however no significant relationship between use of telehealth and gender, marital status, highest level of education, religion, tribe and average monthly income of head of household.

**Table 9** Relationship between level of knowledge of telehealth and use of telehealth

		Have you used telehealth before?		X2 p-value
		Yes	No	
Level of knowledge	Good	64	17	
	Fair	44	24	16.489 <0.001
	Poor	32	36	

There was a significant relationship between fair level of knowledge of telehealth ( $P < 0.001$ ) and use of telehealth.

**Table 10** Further relationship between use of telehealth and socio-demographic variables

Have you used telehealth before?	p-value	AOR(CI)
Gender		
Male	0.656	0.858(0.437, 1.685)
Female	.	.
Marital status		
Never married	0.587	0.657(0.145, 2.988)
Currently married	0.411	1.806(0.442, 7.378)
Separated	.	.

Divorced	0.547	0.397(0.02, 8.045)
Widowed	.	.
Highest educational level		
Primary	0.834	1.217(0.193, 7.674)
Secondary	0.023	8.892(1.344, 58.828)
Tertiary	0.057	6.506(0.945, 44.799)
Postgraduate	0.804	1.537(0.052, 45.41)
No formal education	.	.
Employment status		
Employed	0.025	0.197(0.047, 0.818)
Schooling	0.003	0.096(0.02, 0.46)
Unemployed	.	.
Average monthly income		
Low income	0.947	1.030(0.434, 2.445)
Middle income	0.790	0.903(0.424, 1.92)
High income	.	.

This regression model indicated that participants who were more likely to use telehealth include those with higher education (senior school certificate examination) with Adjusted Odds Ratio (AOR); 8.892, 95% CI (1.344,58.828), those who were employed with Adjusted Odds Ratio (AOR); 0.197, 95%CI (0.047, 0.818) and those who were schooling with Adjusted Odds Ratio (AOR); 0.096, 95% CI ( 0.02, 0.46). The model however showed no significant association between use of telehealth and gender, marital status and average monthly income of head of household.

#### 4. Discussion

This was a cross-sectional descriptive study of use of telehealth for health care by adults with chronic health conditions among households in Nnewi, Anambra state. From literature reviewed, this is probably the first work on this subject matter in Nigeria. Findings from this research showed that 4 out of 5 participants were aware of telehealth which is in line with the interviewer-administered research study carried out in Australia;<sup>10</sup> however this contradicted the national phone survey done in Netherlands<sup>11</sup> which showed that about 1 out of 5 were aware of telehealth. About 1 out of every 3 participants in this study had good knowledge and there was significant association between having at least a secondary education and level of knowledge of telehealth, which was in tandem with the research in the western countries.<sup>11,12</sup> This implies that awareness of telehealth does not translate to good knowledge of it. However, this was contrary to the study done in Ethiopia<sup>13</sup> showed that about 1 out of every 2 participants in the study had a good knowledge of telehealth. A common finding between our finding from this study and other studies referenced showed statistically significant association between level of education of the participants with the level of knowledge of telehealth with  $p < 0.05$ <sup>13</sup>. This study showed that about 3 out of every 5 participants had used telehealth before. This was contrary to the work done in the United States during COVID 19 pandemic among American citizens which showed that about 1 out of every 2 participants had used telehealth.<sup>14</sup>

This study divided the factors affecting use of telehealth for healthcare into barriers and facilitators. It was found that about 1 out of every 2 participants had a level of computer literacy as the most common factor that affects in a good way how they use telehealth. This contradicted another study done in the western world which showed that increased access and increase in health and quality were the commonest facilitators to the use of telehealth<sup>15</sup>. Other facilitators from this study which was similar to previous studies that affected in a good way how respondents used telehealth include: level of education, health literacy, increased convenience, ease of reaching out to a doctor, good cost of using telehealth, adequate electricity, age, having a high income, being under health insurance, and perceived good health status<sup>15,16</sup>. Findings from this work also showed that about 1 out of every 2 participants had poor mobile network as the commonest barrier to their use of telehealth which was contrary to the work done in the western world,<sup>15,17</sup> which showed that the barriers identified most was lack of evidence. Other barriers which affected the use of telehealth include

high cost of using telehealth, age, perceived good health status, not being under health insurance, low income, poor electricity, lack of convenience, no long-term result, self-management difficult to maintain, attitude of doctors, and difficulty in reaching a doctor; and this was similar to the findings from other studies.<sup>15,16,18</sup>.

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## 5. Conclusion

From this study even though the awareness of telehealth was high, still the level of knowledge of telehealth was not adequate probably because of the educational status of the participants which had statistically significant association with the level of knowledge of telehealth. The use of telehealth for healthcare was also not optimal due to several barriers, the commonest of which was poor mobile network. Hence to improve the awareness, level of knowledge and use of telehealth for healthcare, there's need for concerted effort between individuals, health care professionals, telecommunication agencies, non-governmental organizations (NGOs) and the government.

### *Recommendation*

Following the findings from this study the following recommendations are made.

- The government should sponsor policies that allows for education of citizens across all socioeconomic background to at least senior secondary school level. This would aid greatly in increasing the literacy level among the population and consequently their knowledge and use of telehealth for accessing care.
- There should be a concerted effort by healthcare professionals and NGOs to educate patients on the use of telehealth, to improve the knowledge of telehealth and its use among adults with chronic health conditions and the citizens at large.
- The government and telecommunication companies should see to the availability of steady and adequate mobile network, and the government providing physical and social amenities (health insurance, electricity) that would ensure seamless and adequate use of telehealth.
- Ministry of health providing an emergency response number like the 911 in United states of America through which patients in households (outpatient) can reach a health care professional in their times of health needs.

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## Compliance with ethical standards

### *Acknowledgments*

Special thanks go to our study participants, who significantly contributed to new findings in the research field of telemedicine applications with their participation in this study.

### *Disclosure of conflict of interest*

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

### *Statement of ethical approval*

Ethical clearance was sought and obtained from the Ethics committee of Nnamdi Azikiwe University Teaching Hospital with ethical approval number NAUTH/CS/66/VOL.16/VER.3/235/2022/099 and permission was obtained from the relevant authorities. Full informed consent was obtained from the participants, and only those who gave consent participated in the study. Data privacy was strictly adhered to, and participants were properly informed about it.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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## References

- [1] What is telehealth? How is telehealth different from telemedicine? [Internet]. Healthit.gov. [cited 2022 Mar 2]. Available from: <https://www.healthit.gov/faq/what-telehealth-how-telehealth-different-telemedicine>

- [2] Modglin L. Telehealth vs. telemedicine examples, pros, and cons [Internet]. The Checkup. 2021 [cited 2022 Mar 2]. Available from: <https://www.singlecare.com/blog/telehealth-vs-telemedicine/>
- [3] Ryu S. Telemedicine: Opportunities and developments in member states: Report on the second global survey on eHealth 2009 (global observatory for eHealth series, volume 2). Healthc Inform Res [Internet]. 2012; 18(2):153. Available from: <http://dx.doi.org/10.4258/hir.2012.18.2.15>
- [4] Board on Health Care Services, Institute of Medicine. The evolution of telehealth: Where have we been and where are we going? Washington, D.C., DC: National Academies Press; 2012.
- [5] Definition of HEALTH CARE [Internet]. Merriam-webster.com. [cited 2022 Mar 5]. Available from: <https://www.merriam-webster.com/dictionary/health%20care>.
- [6] Physiopedia. Chronic disease [Internet]. [cited 2022 Mar 5]. Available from: [https://www.physio-pedia.com/Chronic\\_Disease](https://www.physio-pedia.com/Chronic_Disease).
- [7] Seidu AA, Darteh EKM, Agbaglo E, Dadzie LK, Ahinkorah BO, Ameyaw EK, et al. Barriers to accessing healthcare among women in Ghana: a multilevel modelling. BMC Public Health [Internet]. 2020; 20(1):1916. Available from: <http://dx.doi.org/10.1186/s12889-020-10017-8>.
- [8] Wikipedia contributors. Nnewi [Internet]. Wikipedia, The Free Encyclopedia. Available from: <https://en.m.wikipedia.org/wiki/Nnewi>
- [9] Shiferaw KB, Tilahun BC, Endehabtu BF, Gullslett MK, Mengiste SA. E-health literacy and associated factors among chronic patients in a low-income country: a cross-sectional survey. BMC Med Inform Decis Mak [Internet]. 2020; 20(1):181. Available from: <http://dx.doi.org/10.1186/s12911-020-01202-1>
- [10] Bradford NK, Caffery LJ, Smith AC. Awareness, experiences and perceptions of telehealth in a rural Queensland community. BMC Health Serv Res [Internet]. 2015; 15(1):427. Available from: <http://dx.doi.org/10.1186/s12913-015-1094-7>
- [11] Hofstede J, de-Bie J, van-Wijngaarden B, Heijmans M. Knowledge, use and attitude toward eHealth among patients with chronic lung diseases. Int J Med Inform [Internet]. 2014; 83(12):967–74. Available from: <https://www.sciencedirect.com/science/article/pii/S1386505614001658>
- [12] Schrauben SJ, Appel L, Rivera E, Lora CM, Lash JP, Chen J, et al. Mobile health (mHealth) technology: Assessment of availability, acceptability, and use in CKD. Am J Kidney Dis [Internet]. 2021 [cited 2022 Mar 5]; 77(6):941–950.e1. Available from: [https://www.ajkd.org/article/S0272-6386\(20\)31139-2/fulltext](https://www.ajkd.org/article/S0272-6386(20)31139-2/fulltext)
- [13] Shiferaw KB, Tilahun BC, Endehabtu BF, Gullslett MK, Mengiste SA. E-health literacy and associated factors among chronic patients in a low-income country: a cross-sectional survey. BMC Med Inform Decis Mak [Internet]. 2020; 20(1):181. Available from: <http://dx.doi.org/10.1186/s12911-020-01202-1>
- [14] Kyle MA, Blendon RJ, Findling MG, Benson JM. Telehealth use and Satisfaction among U.S. Households: Results of a National Survey. J Patient Exp [Internet]. 2021 [cited 2022 Mar 5]; 8:23743735211052736. Available from: <https://pubmed.ncbi.nlm.nih.gov/34734114/>
- [15] Fitzner K, Moss G. Telehealth—an effective delivery method for diabetes self-management education? Popul Health Manag [Internet]. 2013; 16(3):169–77. Available from: <http://dx.doi.org/10.1089/pop.2012.0054>
- [16] McKoy J, Fitzner K, Margetts M, Heckinger E, Specker J, Roth L, et al. Are telehealth technologies for hypertension care and self-management effective or simply risky and costly? Popul Health Manag [Internet]. 2015; 18(3):192–202. Available from: <http://dx.doi.org/10.1089/pop.2014.0073>
- [17] Shaw RJ, Kaufman MA, Bosworth HB, Weiner BJ, Zullig LL, Lee S-YD, et al. Organizational factors associated with readiness to implement and translate a primary care based telemedicine behavioral program to improve blood pressure control: the HTN-IMPROVE study. Implement Sci [Internet]. 2013; 8(1):106. Available from: <http://dx.doi.org/10.1186/1748-5908-8-106>
- [18] Piette JD, Marinec N, Gallegos-Cabrales EC, Gutierrez-Valverde JM, Rodriguez-Saldaña J, Mendoz-Alevares M, et al. Spanish-speaking patients' engagement in interactive voice response (IVR) support calls for chronic disease self-management: data from three countries. J Telemed Telecare [Internet]. 2013; 19(2):89–94. Available from: <http://europaepmc.org/article/MED/23532005>